

8-10-00

# UTILITY PATENT APPLICATION TRANSMITTAL (Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.  
500488.091556Total Pages in this Submission  
19**TO THE ASSISTANT COMMISSIONER FOR PATENTS**Box Patent Application  
Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

**FOCUS FADER WITH DUAL OPTOCOUPERS**

and invented by:

**Ruben Meraz**If a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: \_\_\_\_\_

Which is a:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: \_\_\_\_\_

Which is a:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: \_\_\_\_\_

Enclosed are:

**Application Elements**

1. ☒ Filing fee as calculated and transmitted as described below
2. ☒ Specification having nine (9) pages and including the following:
  - a. ☒ Descriptive Title of the Invention
  - b. ☐ Cross References to Related Applications (if applicable)
  - c. ☐ Statement Regarding Federally-sponsored Research/Development (if applicable)
  - d. ☐ Reference to Microfiche Appendix (if applicable)
  - e. ☒ Background of the Invention
  - f. ☒ Brief Summary of the Invention
  - g. ☒ Brief Description of the Drawings (if drawings filed)
  - h. ☒ Detailed Description
  - i. ☒ Claim(s) as Classified Below
  - j. ☒ Abstract of the Disclosure

**UTILITY PATENT APPLICATION TRANSMITTAL**  
**(Large Entity)**

*(Only for new nonprovisional applications under 37 CFR 1.53(b))*

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**Application Elements (Continued)**

3. ☒ Drawing(s) *(when necessary as prescribed by 35 USC 113)*
- a. ☐ Formal                      Number of Sheets \_\_\_\_\_
- b. ☒ Informal                      Number of Sheets one (1)
4. ☒ Oath or Declaration
- a. ☒ Newly executed *(original or copy)*                      ☐ Unexecuted
- b. ☐ Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional application only)*
- c. ☒ With Power of Attorney                      ☐ Without Power of Attorney
- d. ☐ DELETION OF INVENTOR(S)  
Signed statement attached deleting inventor(s) named in the prior application,  
see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference *(usable if Box 4b is checked)*  
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied  
under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby  
incorporated by reference therein.
6. ☐ Computer Program in Microfiche *(Appendix)*
7. ☐ Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all must be included)*
- a. ☐ Paper Copy
- b. ☐ Computer Readable Copy *(identical to computer copy)*
- c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

**Accompanying Application Parts**

8. ☒ Assignment Papers *(cover sheet & document(s))*
9. ☐ 37 CFR 3.73(B) Statement *(when there is an assignee)*
10. ☐ English Translation Document *(if applicable)*
11. ☐ Information Disclosure Statement/PTO-1449                      ☐ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Acknowledgment postcard
14. ☒ Certificate of Mailing
- ☐ First Class    ☒ Express Mail *(Specify Label No.):* EK839444523US

**UTILITY PATENT APPLICATION TRANSMITTAL**  
**(Large Entity)**

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**Accompanying Application Parts (Continued)**

15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☐ Additional Enclosures (please identify below):

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**Fee Calculation and Transmittal**

**CLAIMS AS FILED**

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	11	- 20 =	0	x \$18.00	\$0.00
Indep. Claims	1	- 3 =	0	x \$78.00	\$0.00
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>					\$0.00
BASIC FEE					\$690.00
OTHER FEE (specify purpose) Recording Assignment					\$40.00
TOTAL FILING FEE					\$730.00

- ☐ A check in the amount of \_\_\_\_\_ to cover the filing fee is enclosed.
- ☒ The Commissioner is hereby authorized to charge and credit Deposit Account No. 50-1145 as described below. A duplicate copy of this sheet is enclosed.
- ☒ Charge the amount of \$690.00 as filing fee.
- ☒ Credit any overpayment.
- ☒ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
- ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

  
Signature

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Dated: August 9, 2000

CC:

08-10-00

A

**CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10)**

Docket No.

500488.091556

Depositor(s): **Ruben Meraz**

Serial No.

Not Yet Assigned

Filing Date

Filed herewith

Examiner

Not Yet Assigned

Group Art Unit

Not Yet Assigned

Invention:

**FOCUS FADER WITH DUAL OPTOCOUPERS**

I hereby certify that the following correspondence:

**UTILITY PATENT APPLICATION**

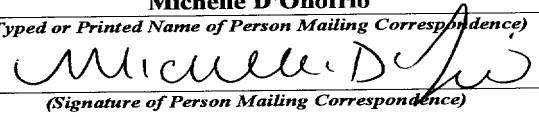
*(Identify type of correspondence)*

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to: The Assistant Commissioner for Patents, Washington, D.C. 20231

**August 9, 2000**  
*(Date)*

**Michelle D'Onofrio**

*(Typed or Printed Name of Person Mailing Correspondence)*



*(Signature of Person Mailing Correspondence)*

**EK839444523US**

*("Express Mail" Mailing Label Number)*

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BACKGROUND OF THE INVENTIONField of the Invention

This invention pertains to a cross fader with dual optocouplers, which can be used in a DJ (disk jockey) mixer or as a replacement cross fader for a DJ mixer.

Description of the Prior Art

In the prior art, cross faders have used resistive components to allow a user, such as a disk jockey, to cut or short out a first signal from a respective channel of audio signal, while allowing the opposite channel of signal to pass. However, such resistive cross faders have been deficient with respect to noise, wear characteristics and lack of complete cutting of the respective signal.

OBJECTS AND SUMMARY OF INVENTION

It is therefore an object of the present invention to provide a cross fader which has improved characteristics with respect to noise.

It is therefore a still further object of the present invention to provide a cross fader which has improved characteristics with respect to wear.

It is therefore a still further object of the present invention to provide a cross fader which has improved characteristics with respect to the degree to which the signal is cut.

It is therefore a final object of the present invention to provide a cross fader which is mechanically and electronically compatible with existing equipment.

These and other objects are attained by providing a cross fader which uses dual optocouplers -- one for each respective channel of the audio signal and located at each end of the fader travel. A blade shutter is positioned by guide rods so that it passes between the operational slots of the optocouplers. The blade shutter is mechanically coupled to a knob on the outside of the cross fader so that the operator can move the blade shutter into the operational slot of an optocoupler, thereby cutting the channel of the audio signal from that optocoupler while allowing the other channel of the audio signal from the other optocoupler to pass unimpeded.

The optocouplers are mounted on a p.c. board for ease of assembly. Likewise, the entire mechanism is mounted to a mounting plate for ease in replacement and securing to the frame of the disk jockey mixer.

### DESCRIPTION OF THE DRAWINGS

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a side view, partially in phantom, of the cross fader of the present invention.

Figure 2 is a top view, partially in phantom, of the cross fader of the present invention.

Figure 3 is an end view, partially in phantom, of the cross fader of the present invention.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail wherein like numerals refer to like elements throughout the several views, one sees that Figure 1 is a side view of cross fader 10 of the present invention. Cross fader 10 includes hollow casing 11 formed from bottom plate 12 (which is typically formed from a P.C. board), top plate 14, end plates 16 and 18, and side plates 20 and 22 (see Figure 3). Moreover, face plate 24 is affixed to top plate 14 and extends past end plates 16 and 18. As shown in Figure 2, face plate 24 includes mounting apertures 26, 28 formed inwardly adjacent from the ends of mounting plate 24 and outwardly from end plates 16, 18, respectively. Mounting

apertures 26, 28 are sized and spaced to allow cross fader to be mounted on conventional mixer panels as used by disk jockeys.

The interior of bottom plate 12 includes optocouplers 30, 32 at opposite ends thereof. As can be seen from Figure 3, optocouplers 30, 32 are C-shaped with parallel side faces 34, 36 and 38, 40, respectively. Side faces 34, 36 of optocoupler 30 are joined by end face 42, thereby forming space 44 with mouth 46. Likewise, side faces 38, 40 of optocoupler 32 are joined by end face 48, thereby forming space 50 with mouth 52.

Optocouplers 30, 32 receive first and second channels of an audio signal, respectively. The first channel is converted to an optical signal and transmitted from side face 34 through space 44 to side face 36. Likewise, the second channel is converted to an optical signal and transmitted from side face 36 through space 50 to side face 38. These optical signals can be attenuated or completely eliminated by the positioning of opaque material within spaces 44, 50. The input and output of the first and second channels, along with the power requirements, are provided through jack 52 which is on the exterior of bottom plate 12 (which, again, is preferably formed as a P.C. board).

Blade shutter 54, as shown in Figure 1 and 3, is mounted to support structure 56. Support structure 56 includes apertures 58, 60 through which parallel guide rods 62, 64 pass. Parallel guide rods 62, 64 are supported by end plates 16, 18. If the



blade shutter 54 is pushed to a first extreme of the path of blade shutter 54, first edge 53 of blade shutter 54 is inserted through mouth 46 into space 44 thereby cutting or at least attenuating the optical signal communicated through optocoupler 30, while being free of contact or interference with optocoupler 32 thereby allowing the optical signal to pass without attenuation through optocoupler 32. Likewise, if blade shutter 54 is pushed to a second extreme of the path of blade shutter 54, second edge 55 of blade shutter 54 is inserted through mouth 52 into space 50 thereby cutting or at least attenuating the optical signal communicated through optocoupler 32, while being free of contact or interference with optocoupler 30 thereby allowing the optical signal to pass without attenuation through optocoupler 30. Furthermore, as shown in Figure 1, as the length of blade shutter 54 (measured horizontally from the perspective of Figure 1) is substantially less than the length of travel between spaces 44, 50, there is a range of positions of blade shutter 54 wherein blade shutter 54 is free from insertion into spaces 44, 50 and both optocouplers 30, 32 pass the respective signals without attenuation.

The position of blade shutter 54 is manually controlled by the user by the linear movement of knob 66. As shown in Figure 2, slot 68 is formed through top plate 14 and face plate 24 allowing for stem 68 to provide direct mechanical communication



## CLAIMS

### What is Claimed is:

1. A cross fader including:

a first optocoupler for receiving and transmitting a first signal, said first optocoupler including a first space through which said first signal is optically communicated;

a second optocoupler for receiving and transmitting a second signal, said second optocoupler including a second space through which said second signal is optically communicated; and

a shutter means with a range of travel, wherein at a first position in said range of travel, said shutter means is inserted into said first space thereby at least attenuating said first signal, and wherein at a second position in said range of travel, said shutter means is inserted into said second space thereby at least attenuating said second signal.

2. The cross fader of Claim 1 wherein said shutter means is a blade shutter.

3. The cross fader of Claim 2 wherein said first position is at a first end of said range of travel and wherein said second position is at a second end of said range of travel.

4. The cross fader of Claim 3 wherein said first and second optocouplers are C-shaped with a mouth through which said blade shutter enters said first and second spaces, respectively.

5. The cross fader of Claim 4 wherein said blade shutter is mechanically responsive to a stem which passes through a slot a surface of said cross fader to affix to a knob, wherein a user manipulates said knob to move said blade shutter within said range of travel.

6. The cross fader of Claim 5 wherein guide rods define a direction of said range of travel.

7. The cross fader of Claim 6 wherein said blade shutter is mounted on a support structure, said support structure including apertures through which said guide rods pass.

8. The cross fader of Claim 7 wherein said knob is moved linearly along a path defined by said slot in order to move said blade shutter along said range of travel.

9. The cross fader of Claim 8 wherein said range of travel includes a range of positions wherein said blade shutter is free from insertion into said first and second spaces.

10. The cross fader of Claim 9 wherein said first and second optocouplers are mounted on a p.c. board, said p.c. board forming an interior surface of a chassis.

11. The cross fader of Claim 10 wherein a face plate with mounting apertures is secured to said chassis.

### ABSTRACT OF THE DISCLOSURE

The apparatus is a cross fader with dual optocouplers which communicate first and second audio signals. A manually controlled blade shutter travels along a linear path wherein at a first end of the path, a first edge of the blade shutter is inserted into the first optocoupler thereby attenuating or cutting the first audio signal. Likewise, at a second end of the path, a second edge of the blade shutter is inserted into the second optocoupler thereby attenuating or cutting the second audio signal.



## COMBINED DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor(s), I (We) hereby declare that:

My (Our) residence, post office address and citizenship are as stated below next to my (our) name(s). I (We) believe I (we) am (are) the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

**FOCUS FADER WITH DUAL OPTOCOUPERS**, the specification of which is attached hereto unless the following is checked:

\_\_ was filed on \_\_\_\_\_ as United States Application

Number or PCT International Application Number

and was amended on \_\_\_\_\_ (if applicable).

I (We) hereby state that I (we) have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I (We) acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)			
NUMBER	COUNTRY	DATE FILED	PRIORITY CLAIMED
			YES NO
			YES NO
			YES NO

I (We) hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.



APPLICATION NO.	FILING DATE	STATUS PATENTED, PENDING, ABANDONED

I (We) hereby declare that all statements made herein of my (our) own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I (We) hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: Joseph C. Sullivan, Registration No. 18,720; J. David Dainow, Registration No. 22,959; Gerald Levy, Registration No. 24,419; Ronald R. Santucci, Registration No. 28,988; Ronald E. Brown, Registration No. 32,200; Matthew W. Siegal, Registration No. 32,941; John Gulbin, Registration No. 33,180. \*I (We) further authorize my (our) attorney to insert the proper serial number and filing date awarded to my (our) application on this document, above my (our) signature(s).

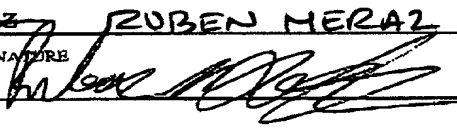
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